

**REMARKS**

Claims 1-18 are now pending in this application. In response to the Office Action mailed on January 28, 2008, claims 1-18 are amended. No new matter has been added. Favorable reconsideration of the application in light of the foregoing amendments and following comments is respectfully solicited.

Objections to the Claims

On page 2 of the Office Action, claims 2-6, 8, 9, 11-15, 17, and 18 were objected to for failure to properly use subscripts and superscripts. The claims have been amended to correct this informality, and Applicants respectfully request withdrawal of the objections.

Rejections Under 35 U.S.C. § 112, ¶ 2

On page 2 of the Office Action, claims 1, 4, 7, 10, 13, and 18 were rejected under 35 U.S.C. § 112, ¶ 2, as being indefinite. Applicants respectfully submit that the claims, as amended, comply with 35 U.S.C. § 112, ¶ 2, and request withdrawal of the rejections.

Rejections for Nonstatutory Double Patenting

Claims 10, 13, and 15 were rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4-9 of U.S. Patent 7,288,889 (Kawamura '889). Applicants respectfully traverse.

Claim 10 recites:

A phosphor comprising:  
a main material including a first oxide, and  
a second oxide containing an element, with electronegativity larger than  
the oxide included in the main material;

wherein  
the surface of the phosphor would bear a positive (+) charge if the  
phosphor were formed without the second oxide, and  
the second oxide is added such that the absolute value of the charge of the  
phosphor does not exceed 0.01  $\mu\text{C/g}$ .

However, Kawamura '889 does not disclose or suggest controlling the charge of a phosphor with a second oxide "such that the absolute value of the charge of the phosphor does not exceed 0.01  $\mu\text{C/g}$ ," as recited. For at least this reason, claim 10 is not obvious in view of Kawamura '889. Nor are dependent claims 13 and 15, as "dependent claims are nonobvious if the independent claims from which they depend are nonobvious." *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Thus, Applicants respectfully request withdrawal of the rejections for nonstatutory obviousness-type double patenting.

Rejections Under 35 U.S.C. § 102

On page 3, claims 7-9 and 16-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent App. Pub. No. H11-086735 (Kurai). On page 4, claims 10, 14, and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Nos. 5,744,233 (Opitz) or 5,985,175 (Fan). On page 4, claims 10 and 14-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,289,081 (Tamatani). On page 4, claims 7-9 and 16-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by WO 03/056596 / U.S. Patent No. 7,232,530 (Kawamura '596). On page 5, claims 1, 4, 6, 10, 13, and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by WO 03/025090 / U.S. Patent App. Pub. No. 2004/0051440 (Sugimoto) or WO 03/025088 / U.S. Patent App. Pub. No. 2004/0043692 / U.S. Patent No. 7,288,889 (Kawamura '889 – also relied upon for the double patenting rejections).

On page 5, claims 1 and 4-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent App. Pub. No 2000-285809 (Hoshizaki). Applicants respectfully traverse.

Each one of independent claims 1, 7, 10, and 16 recites, *inter alia*, that

the second oxide is added such that **the absolute value of the charge of the phosphor layer does not exceed 0.01  $\mu\text{C/g}$ .**

As discussed in the instant application, the recited limitations prevent uneven display caused by uneven application of the phosphor and also suppresses discharge failure and luminance degradation.

None of the references disclose, or even suggest, adding a second oxide “such that the absolute value of the charge of the phosphor layer does not exceed 0.01  $\mu\text{C/g}$ ,” as recited in the claims.

The following references **do not disclose or suggest even adjusting the amount of an oxide to change the charge** of the phosphor layer:

- **Opitz**, claim 9, recites a coating “consisting essentially of silicon dioxide and at least one oxide of . . . boron . . . wherein the molar ratio of silicon dioxide to the oxide of the further element is within the range of 100:0.1 to 100:15.” This is done so that “a luminescent powder . . . is protected from attack” (col. 2, ll. 7-9; *see also* col. 2, ll. 18-26). No disclosure is made regarding a “charge of the phosphor layer.”
- **Fan** discloses boron oxide coated phosphors, noting “[s]uch coatings have a wide range of utility including providing protection from environmental antagonists such as moisture, ionized mercury, and certain ultraviolet wavelengths [and that] the quantum efficiency of a conventional fluorescent lamp phosphor can be improved by coating the individual phosphor particles with a very thin layer of boron oxide” (col. 2, ll. 6-12). No disclosure is made regarding a “charge of the phosphor layer.”

- **Sugimoto** merely discloses “degradation characteristics of the blue phosphor can further be inhibited by attaching an oxide, e.g.  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ , and  $\text{La}_2\text{O}_3$ , and a fluoride, e.g.  $\text{LaF}_2$  and  $\text{AlF}_3$ , to the surface of the phosphor” (¶ [0085] of U.S. Patent App. Pub. No. 2004/0051440; *see also* ¶ [0091]). No disclosure is made regarding adjusting the amount of oxide to obtain a desired charge.
- **Kawamura '889** discloses that “luminance degradation . . . is caused by selective adsorption of water or carbonic acid gas to defects in Ba--O layers” (¶ [0021] of U.S. Patent App. Pub. No. 2004/0043692), and that “selective adsorption of an oxide or a fluorine-containing oxide prevents degradation of the blue phosphor in a panel manufacturing process and in driving a panel, without causing degradation of the luminance of the blue phosphor” (¶ [0022]). No disclosure is made regarding adjusting the amount of oxide to obtain a desired charge.

The following references **do not disclose or suggest** controlling the charge of a phosphor with a second oxide “such that the absolute value of the charge of the phosphor does not exceed  $0.01 \mu\text{C/g}$ ”:

- **Kurai** states that “it is advantageous that the electrification nature of a fluorescent substance has a **plus polarity**” (¶ [0015]; *see also* ¶ [0021]).
- **Tamatani**, Table 7, discloses a number of examples of  $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$  and  $\text{Zn}_2\text{SiO}_4:\text{Mn}^{2+}$  phosphors combined with various oxides. In **none** of these, or any other embodiments disclosed by Tamatani, is the **absolute value less than  $0.01 \mu\text{C/g}$** . The arrows in FIG. 7 do not disclose ranges, but merely illustrate the changes in charge that accompany a change from iron to glass as a carrier. The dots at the ends of the arrows illustrate actual

values. Further, the **scale** at which FIGS. 5-7 illustrate charge values **does not suggest controlling a charge within 0.01  $\mu\text{C/g}$ .**

- **Hoshizaki** discloses that “it is preferred that the charge quantity accumulated in the fluorescent screen surface is uniform” (¶ [0005]). Thus, the “charge quantity accumulated in the red fluorescent screen surface by mixing the oxide which is tinged with right value to a negative charge into the red fluorescent screen charged easily is made equivalent to a green fluorescence film or a blue fluorescent screen” (¶ [0030]; ¶ [0031] (addition of  $\text{SiO}_2$  changes charge from an initial value of +0.074 to a final value of -0.248). Additionally, addition of oxide to green and blue phosphors can obtain “margin range equivalent to the cell of a red fluorescent screen” (¶ [0037]). **None of the disclosed adjustments teach or suggest controlling the charge such that it has an absolute value of less than 0.01  $\mu\text{C/g}$ .**
- **Kawamura '596** discloses a “green phosphor having zero or positive charges and a crystal structure of  $\text{Zn}_2\text{SiO}_4\text{:Mn}$ ” (Abstract of U.S. Patent No. 7,232,530) formed by coating with a positively charged oxide or “such that the crystal face is broken up and the negative charges are **changed to positive charges**” (col. 2, ll. 57-62). The reference does not disclose producing a zero charge to the precision recited in the claims (*i.e.*, absolute value less than 0.01  $\mu\text{C/g}$ ), but instead is **merely concerned with producing a non-negative charge** (*i.e.*, “positively or zero charged” (claims 1-3; col. 3, ll. 53-55)), **to avoid certain disclosed shortcomings of negatively charged green phosphor material** (*see* col. 2, ll. 1-16).

As detailed above, the references relied upon by the rejections under 35 U.S.C. § 102(b) do not disclose, or even suggest, all of the limitations recited in independent claims 1, 7, 10, and

16 – at the very least with respect to “the second oxide [being] added such that **the absolute value of the charge of the phosphor layer does not exceed 0.01  $\mu\text{C/g}$ .**” Thus, the cited art is unable to sustain a *prima facie* case of anticipation against claims 1, 7, 10, or 16, as well as dependent claim 2-6, 8, 9, 11-15, 17, and 18, which require at least the same limitations as the independent claims they respectively depend upon. Therefore, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 102.

Conclusion

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner’s amendment, Examiner is requested to call Applicants’ attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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